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PROTECTION OF THE QUALITY AND SUPPLY OF FRESHWATER RESOURCES: APPLICATION OF INTEGRATED APPROACHES TO THE DEVELOPMENT, MANAGEMENT AND USE OF WATER RESOURCES

Sustainable use of water resources in agriculture

Report of the Secretary-General of the Conference

Reference is made to Decision 1/21 of the Preparatory Committee for the United Nations Conference on Environment and Development through which the Food and Agriculture Organization of the United Nations was invited to consider this issue in its preparation of a strategy for sustainable agriculture. In response to the request of the Preparatory Committee to be kept informed of progress in that area, the Food and Agriculture Organization of the United Nations provided the following report.

1. BACKGROUND

The United Nations Water Conference, convened in Mar del Plata, Argentina in March 1977, was the first "water" meeting of its kind at a very high policy-making level. The Conference produced a comprehensive set of recommendations, known as the Mar del Plata Action Plan (MDPAP), which was approved by all Member States for implementation. An analysis of the progress made in the implementation of the Mar del Plata Action Plan in 1987, 10 years later, revealed that while significant progress has been made in some areas of

water development such as the drinking water supply and sanitation, much remained to be done in other areas. As a consequence, the ACC-Intersecretariat Group on Water Resources (ACC-ISGWR), at its eighth session in 1987, felt the need to reactivate the MDPAP and recommended that a comprehensive strategy should be developed for its implementation in the 1990s. The United Nations Committee on Natural Resources (CNR) and the Economic and Social Council (ECOSOC) supported this recommendation of the ACC-ISGWR and ECOSOC Resolution 1987/7 requested the Secretary-General to undertake the following:

> "In consultation with the Regional Commissions and Organizations of the United Nations Systems, to report to the Committee on Natural Resources at its eleventh session on progress in formulating proposals for a comprehensive strategy to implement the Mar del Plata Action Plan during the decade 1991-2000, and to include an assessment of these proposals as they relate to the action of the United Nations System."

In response, the ACC-ISGWR convened a meeting of an expert panel to advise the United Nations System organizations on the formulation of the requested strategy for the 1990s. The Panel recommended six activities to constitute key elements of the strategy, namely, water resources assessment, sustainable agricultural development, mobilization of financial resources, human resources development, institutional strengthening and promotion of appropriate technology. FAO was designated the lead agency for the sustainable agricultural development element of the strategy.

2. DEVELOPMENT OF THE ACTION PROGRAMME

In accord with the foregoing mandates, FAO prepared an outline for an action programme on water and sustainable agricultural development and submitted it to the tenth session of the ACC-ISGWR in October 1989. The proposal was endorsed with the recommendation to form the ACC-ISGWR Working Group on Water and Sustainable Agricultural Development to enable interagency participation in the further development of the FAO proposed action programme.

As part of this further development FAO, through UNDP funding and assistance from UNDTCD and UNDIESA, carried out four regional assessment missions on agricultural water use to evaluate progress made in this area since the declaration of the MDPAP in 1977 and identify specific needs and priority areas for action during the 1990s. These were followed by two formal expert consultations during which the action programme on water and sustainable development was discussed with relevant United Nations organizations and selected donor and developing country representatives. The reward of these joint activities of the United Nations System organizations in agricultural water use is the International Action Programme on Water and Sustainable Agricultural Development (IAP-WASAD). The IAP-WASAD was approved as a key component of the MDPAP Strategy for the 1990s by the ACC-ISGWR at its eleventh session in October 1990.

3. REGIONAL ASSESSMENT MISSIONS ON AGRICULTURAL WATER USE

The regional assessment missions in four regions, namely, Africa, Asia and the Pacific, Latin America and the Caribbean and Near East and North Africa were carried out during January to March 1990. The following summarizes main conclusions and findings. These findings form the basis of priorities of the Interagency Action Programme on Water and Sustainable Agricultural Development.

In the African region, the important role of irrigation was recognized, particularly in the erratic rainfall and drought-prone areas where irrigation may be the only means to stabilize agricultural production and to save human life. However, irrigation should not be developed in isolation but should be a part of a wide-ranging area development programme. The complementarity of irrigation and rainfed agriculture was recognized and, accordingly, balanced development of the two forms of agriculture in national production plans was found to be essential. Small-scale irrigation developments needed intensification and further support, as they promote greater community participation and are more compatible with the socio-economic settings in Africa; however, the development of large-scale irrigation schemes should not be excluded. In almost all irrigation schemes, water use efficiencies were low, resulting in wastage of water and adverse environmental impacts, particularly waterlogging and salinization and increased incidence of water-borne diseases.

The Asia and Pacific region has made considerable progress in the development of land and water resources since the 1977 United Nations Water Conference, not strictly formulated within the context of the Mar del Plata Action Plan but in response to perceived national needs. The efficiency of water use, associated with the need for more sophisticated water management, is a subject of considerable interest in the main irrigation countries of the region. It is seen from the multiple standpoints of increased crop production, higher yields per unit of land and water, maintenance of soil quality and overall economy of water use.

The problem of waterlogging and salinization is particularly urgent, as the processes are continuing at a rapid pace in China, Iran and Pakistan. Large areas of irrigated land have been abandoned in the region for the same reason, thus contributing to the spread of desertification, which is estimated at one million hectares annually in Asia. The quality of irrigation water shows trends of deterioration and the need for water quality monitoring is urgent. There is increasing awareness of the need to augment water supply and improve water quality through the use of treated sewage effluents.

In the Latin American and Caribbean region there have been important changes in both structure and direction of irrigation investments, particularly in countries with long history of irrigated agriculture. However, many new irrigation developments are characterized by high cost of hydraulic works, slow implementation of on-farm structures and low irrigation efficiencies. Many projects lack drainage works resulting in waterlogging and

salinization of soils. Legislation and the administration of water use for agriculture is a concern of all countries of the region especially with respect to the contamination and pollution of water and water pricing for irrigation.

A common feature among the countries of the Near East and North Africa region is the arid or at least semi-arid climatic conditions. Water is a major limiting factor for agricultural development. In Saudi Arabia, over-exploitation of ground water has resulted in rapid lowering of groundwater level. The main problem of land degradation is related to the buildup of salinity in the irrigated areas. Deteriorating water quality is a major concern in most countries in the region. Inadequate irrigation facilities, particularly at the farm level, and lack of or insufficient drainage have led to low water use efficiencies, waterlogging and rapid buildup of soil salinity. Several countries have embarked on reuse of treated municipal effluents in agriculture, but with varying degrees of success.

Technical and investment assistance is required to ensure successful and safe use of effluents in crop production.

In general, the mission found agreement by senior politicians, technical and managerial personnel that the recommendations of the Mar del Plata Action Plan represent global concerns:

- the need for efficient use of water for agriculture and other purposes;
- preventing loss of land productivity due to waterlogging and salinity; and
- ensuring short and long-term increases in agricultural production.

However, there was consensus that there was insufficient dissemination of the recommendations of the Water Conference to raise the conscience of the leadership of the countries and the general public for the more effective use of water. The MDPAP was not seen as a true action plan as it lacked any formalized objectives, strategies or anticipated results and gave no time frame for implementation.

From the regional assessment missions, several common issues and priorities were found to be relevant, but with varying degrees of importance depending on the region or country concerned. These constituted:

- the need to improve water use efficiency;
- prevention of loss of productivity due to waterlogging and salinity in irrigated as well as rainfed lands;
- better management of water quality from the point of view of meeting agricultural needs as well as preventing water pollution;

- promotion of small-scale water projects; and

- optimum use of water resources under scarce water supply conditions.

Equally, lack of appropriate data and applied research, inadequate human resources, weak institutions and inefficient technology transfer systems were identified as common deficiencies and thus areas for concerted international action.

4. THE INTERNATIONAL ACTION PROGRAMME ON WATER AND SUSTAINABLE AGRICULTURAL DEVELOPMENT

(i) Objective

The main objective of the International Action Programme on Water and Sustainable Agricultural Development (IAP-WASAD) is to assist developing countries in planning, developing and managing water resources on an integrated basis to meet the present and future needs for agricultural production. In meeting this objective, the IAP-WASAD will assist national governments and regional institutions in setting priorities concerning the use of water and land resources for agricultural development, in updating their current policies and strategies, and developing and implementing programmes to translate their policies and plans into action.

The United Nations System will play a catalytic role in the implementation of the Action Programme by creating greater awareness of the importance of integrated water and land development, responding to specific requests to member governments for technical co-operation and assisting in mobilizing bilateral and multilateral donor support for technical assistance and investment for development.

(ii) Issues and priorities

Water is an indispensable resource for all life systems and is a critical component of sustainable agricultural development. One of the important concerns is the need to meet the present and future food needs of a growing world population utilizing the finite resources of water and land in a manner which is environmentally sound and economically viable.

During the past four decades irrigated agriculture provided a major part of the increase in production necessary to meet population demands. By the mid-1980s, 36 per cent of the total crop production came from less thar 15 per cent of the arable land which was irrigated. On a global basis, the average rate of expansion was about 2.3 per cent per year from 1965 to 1975. This began to decrease in the mid-1970s and is now less than 1 per cent per year. The global population, however, is increasing at a rate of 2 per cent per year. This shows clearly that needed increases in production cannot be achieved from continuing increases in irrigated land. Rather, production increases must be achieved from both rainfed and irrigated

agricultural lands. Investment costs in conservation measures to increase available water on rainfed lands must be evaluated relative to capital investments and operating costs of irrigated agriculture.

While the factors and issues associated with water use for sustainable agricultural production are many and complex in nature, the IAP-WASAD has identified, based on the findings of the regional assessment missions and the experience of United Nations System organizations, five critical and priority areas for concerted action, namely: improving water use efficiency; controlling waterlogging and salinity through proper drainage and other agronomic practices; better water quality management; promotion of small-scale irrigation and optimizing the use of scarce water resources. In order to strengthen these priority programmes six support common actions are also recommended for implementation. The five priority areas are as follows:

Water use efficiency

Efficient use of water in the agricultural sector is absolutely critical to improve overall water use efficiency. Positive actions are required to transfer existing technologies and to support their implementation. Urgent action is required to educate and train extension staff; strengthen water and soil management research under irrigated and rainfed conditions; monitor and evaluate irrigation project performance; and establish effective demand management procedures and water-pricing policies.

Waterlogging and salinity control and drainage

In rainfed agriculture, surface drainage is required to prevent any temporary waterlogging and flooding of low lands. In irrigated agriculture, artificial drainage is essential under most conditions. It is essential to minimize drainage requirements and costs by reducing the sources of excess water through improved system design and on-farm water management practices. Design of appropriate drainage systems, securing funds for their construction and maintenance, farmers' involvement in the management of drainage systems and safe disposal of drainage effluents are important. Groundwater monitoring, water balance studies and conjunctive use of surface and ground water should be encouraged. Pilot projects in waterlogged and salinized areas need to be established to verify available technologies and train personnel.

Water quality management

Concerted and planned actions are necessary to establish and operate functional and cost-effective monitoring systems and to ensure that water available for agricultural uses is of an acceptable quality. Simultaneously, appropriate steps must be taken to ensure that agricultural activities do not adversely affect water quality so that subsequent uses of water for different purposes are impaired.

Small-scale water programmes

Small-scale water programmes can fulfil many local water needs and have considerable global potential for the achievement of sustainable agricultural development. Such programmes should include development of small-scale irrigation, water supply for humans and livestock, improved infiltration to groundwater, soil conservation, water harvesting and flood control. These initiatives should be designed to integrate development and conservation and enhance local involvement in environmental management. The programmes, when properly implemented, would generate employment, promote equity, improve health standards and can help to slow down or prevent migration to urban areas.

It is important that small-scale water programmes should be founded on adequate technical advice and support, improved institutional collaboration and greater involvement of local communities.

Scarce water resources management

Water scarcity conditions require long-term strategies and practical implementation programmes for the development of agricultural water use in ways consistent with limited water resources and competing demands for water. National planning capacities should be developed to formulate policies and strategies to cope with scarce water conditions; appropriate legal frameworks on water rights should be formulated to enable efficient and equitable water use; under certain conditions specialized programmes focused on "drought preparedness" should be formulated and implemented with special emphasis on food scarcity, environmental protection and improving community resilience.

In order to implement effectively the foregoing priority areas, certain common and complementary actions need to be taken. These common actions include: (1) development of adequate data bases; (2) adaptive research; (3) institutional strengthening; (4) training (human resources development); (5) better socio-economic analysis; (6) environmental protection and conservation; and (7) technology transfer and infrastructure.

(iii) In its present form, IAP-WASAD is designed to be implemented within the framework of "Arrangements for Inter-organizational Cooperation of the United Nations System at the Global, Regional and Sectoral Levels", as well as within the mandate and policy, programme and operational guidelines of FAO - the lead agency of the programme. Full participation of bilateral and multilateral development agencies is foreseen in every phase of the Action Programme. The requirement for flexibility of approach compatible with the policies and needs of national governments, regional institutions, United Nations System organizations and bilateral and multilateral development agencies is fully recognized.

Basically the IAP-WASAD is a programme to promote and strengthen activities by developing countries to achieve sustainable agricultural

development through more effective management of their water resources. The role of United Nations organizations in this regard is to provide technical co-operation and to mobilize international support for investment and development of the agricultural sector. During the implementation of the Action Programme, any overlapping of United Nations activities will be minimized in order to optimize the use of financial and human resources of the United Nations System, governments and multilateral and bilateral donors. Such optimization can be achieved since the programme will be implemented under the umbrella of the United Nations ACC-ISGWR.

In implementing the IAP-WASAD, the important roles of the main participating groups - the national governments, the United Nations System and the bilateral and multilateral donors - will need to be defined and effectively integrated. Another requirement is to integrate the IAP-WASAD with other action programme components in order to implement a comprehensive water programme under a single Mar del Plata Action Plan strategy for the 1990s. A proposed mechanism of integrating the user-oriented agricultural water use and drinking water supply and sanitation programmes with the issue/service-oriented components is shown in Figure 1.

A national co-ordinating unit (NCU) for implementing all component Action Programmes including IAP-WASAD under the umbrella of the Mar del Plata Action Plan Strategy for the 1990s is a possibility. The major role of such a unit would be to serve as a national focal point to co-ordinate the Action Programmes with relevant national and international organizations at the country level.

At the United Nations System level, the establishment of interagency working groups/steering committees are recommended. The major role of these units is to assist United Nations agencies, national governments and donors in the planning and implementation of multidisciplinary water sector programming missions, identification of projects, developing project documents, seeking donor support, implementation of projects and their monitoring. These units will work under the guidance of the ACC-ISGWR and will serve as the international counterpart to the national co-ordinating units.

Though the Action Programme must be implemented with flexibility, its development must be directed. In order to achieve this, a sequence of important stages of development of the programme or "programme cycle" is suggested. The programme cycles is divided into three phases, namely, planning, implementation and follow-up phases.

A major activity in the planning phase is "the joint country missions" of the United Nations organizations and donors. It is foreseen that these missions which will be undertaken as "water-sector" programming missions involving various United Nations organizations, will identify projects in the context of multi-purpose water development and use in relation to national economic development plans.

5. FOLLOW-UP ACTIONS

1. In accordance with the decision of the Preparatory Committee for the United Nations Conference on Environment and Development, FAO, in collaboration with other United Nations organizations, donors and member country representatives will prepare a fully costed, targetted and scheduled programme. In order to achieve this, some selected joint country missions, formal and informal consultations with United Nations agencies and donors will be carried out in 1991. The final draft document of the resultant plan of action will be presented at the twelfth session of the ACC-ISGWR meeting to be held in September 1991.

2. The IAP-WASAD document, produced in three of the official languages (English, French and Spanish) together with the costed proposal will be subsequently presented at the International Conference on Water and the Environment in Dublin, January 1992. This Conference will be convened to obtain agreement on the strategy and component action programmes of the Mar del Plata Action Plan for the 1990s and to gain political support from member countries and donors for implementing the strategy including IAP-WASAD. FAO feels that it is essential for the United Nations System as a whole to put forward to the United Nations Conference on Environment and Development a combined strategy for the use of water resources. Thus the Dublin Conference will form an integral part of the preparatory process for the United Nations Conference on Environment and Development.